Claims:

1. A biomedical electrode comprising:

a conductive polymeric sheet comprising an upper side and a lower side;

a conductive undercoating attached to the lower side of the conductive polymeric sheet;

an electrolyte layer attached to the conductive undercoating, wherein the conductive undercoating is located between the electrolyte layer and the lower side of the conductive polymeric sheet;

a current spreading layer attached to the upper side of the conductive polymeric sheet, wherein the current spreading layer comprises a metallic layer on the upper side of the conductive polymeric sheet; and

an electrical connector attached to the biomedical electrode, the electrical connector in electrical communication with the conductive polymeric sheet through the current spreading layer.

2. A biomedical electrode according to claim 1, wherein the metallic layer exhibits a bulk conductivity that is greater than a bulk conductivity of the conductive polymeric sheet.

3. A biomedical electrode according to claim 1, wherein the biomedical electrode is free of adhesive between the metallic layer and the conductive polymeric sheet.

4. A biomedical electrode according to claim 1, wherein the metallic layer consists essentially of one or more metals.

5. A biomedical electrode according to claim 1, wherein the metallic layer comprises an electrically conductive ink.

6. A biomedical electrode according to claim 1, wherein the current spreading layer is coextensive with the upper side of the conductive polymeric sheet.

7. A biomedical electrode according to claim 1, wherein the current spreading layer comprises a pattern that comprises one or more voids, wherein a portion of the upper side of the conductive polymeric sheet is free of the metallic layer within the one or more voids.

8. A biomedical electrode according to claim 1, wherein the current spreading layer comprises a moisture barrier between the electrical connector and the electrolyte layer.

9. A biomedical electrode according to claim 1, wherein the conductive undercoating comprises a substantially non-polarizable interface with the electrolyte layer.

10. A biomedical electrode according to claim 1, wherein the conductive polymeric sheet comprises electrically conductive particles dispersed in a polymeric matrix.

11. A biomedical electrode according to claim 1, wherein the electrolyte layer comprises ionically conductive hydrogel pressure sensitive adhesive.

12. A biomedical electrode according to claim 1, further comprising an electrically conductive adhesive tape, wherein the electrically conductive adhesive tape attaches the electrical connector to the current spreading layer.

13. A biomedical electrode according to claim 12, wherein at least a portion of the electrically conductive adhesive tape is located between the electrical connector and the current spreading layer.

14. A biomedical electrode comprising:

a conductive polymeric sheet comprising an upper side and a lower side;

a conductive undercoating attached to the lower side of the conductive polymeric sheet;

an electrolyte layer attached to the conductive undercoating, wherein the conductive undercoating is located between the electrolyte layer and the lower side of the conductive polymeric sheet;

a current spreading layer attached to the upper side of the conductive polymeric sheet, wherein the current spreading layer comprises a pattern that comprises one or more voids, wherein a portion of the upper side of the conductive polymeric sheet is free of the current spreading layer within the one or more voids; and

an electrical connector attached to the biomedical electrode, the electrical connector in electrical communication with the conductive polymeric sheet through the current spreading layer.

15. A biomedical electrode according to claim 14, wherein the biomedical electrode is free of adhesive between the current spreading layer and the conductive polymeric sheet.

16. A biomedical electrode according to claim 14, wherein the current spreading layer exhibits a bulk conductivity that is greater than a bulk conductivity of the conductive polymeric sheet.

17. A biomedical electrode according to claim 14, wherein the current spreading layer is coextensive with the upper side of the conductive polymeric sheet.

18. A biomedical electrode according to claim 14, wherein the current spreading layer consists essentially of one or more metals.

19. A biomedical electrode according to claim 14, wherein the current spreading layer comprises an electrically conductive ink.

20. A biomedical electrode according to claim 14, wherein the conductive undercoating comprises a substantially non-polarizable interface with the electrolyte layer.

21. A biomedical electrode according to claim 14, wherein the conductive polymeric sheet comprises electrically conductive particles dispersed in a polymeric matrix.

22. A biomedical electrode according to claim 14, wherein the electrolyte layer comprises ionically conductive hydrogel pressure sensitive adhesive.

23. A method of manufacturing a biomedical electrode, the method comprising:

providing a conductive polymeric sheet comprising an upper side and a lower side;

attaching a conductive undercoating to a lower side of a conductive polymeric sheet;

attaching an electrolyte layer to the conductive undercoating, wherein the conductive undercoating is located between the electrolyte layer and the lower side of the conductive polymeric sheet;

providing a current spreading layer on the upper side of the conductive polymeric sheet, wherein the current spreading layer comprises a metallic layer on the upper side of the conductive polymeric sheet; and

attaching an electrical connector to the biomedical electrode, the electrical connector in electrical communication with the conductive polymeric sheet through the current spreading layer.

24. A method according to claim 23, wherein the metallic layer exhibits a bulk conductivity that is greater than a bulk conductivity of the conductive polymeric sheet.

25. A method according to claim 23, wherein the biomedical electrode is free of adhesive between the metallic layer and the conductive polymeric sheet.

26. A method according to claim 23, wherein the metallic layer consists essentially of one or more metals.

27. A method according to claim 23, wherein the metallic layer comprises an electrically conductive ink.

28. A method according to claim 23, wherein the current spreading layer is coextensive with the upper side of the conductive polymeric sheet.

29. A method according to claim 23, wherein the current spreading layer comprises a pattern that comprises one or more voids, wherein a portion of the upper side of the conductive polymeric sheet is free of the metallic layer within the one or more voids.

30. A method of manufacturing a biomedical electrode, the method comprising:

providing a conductive polymeric sheet comprising an upper side and a lower side;

attaching a conductive undercoating to a lower side of a conductive polymeric sheet;

attaching an electrolyte layer to the conductive undercoating, wherein the conductive undercoating is located between the electrolyte layer and the lower side of the conductive polymeric sheet;

providing a current spreading layer on an upper side of the conductive polymeric sheet, wherein the current spreading layer comprises a pattern that comprises one or more voids, wherein a portion of the upper side of the conductive polymeric sheet is free of the current spreading layer within the one or more voids; and

attaching an electrical connector to the biomedical electrode, the electrical connector in electrical communication with the conductive polymeric sheet through the current spreading layer.

31. A method according to claim 30, wherein the current spreading layer exhibits a bulk conductivity that is greater than a bulk conductivity of the conductive polymeric sheet.

32. A method according to claim 30, wherein the biomedical electrode is free of adhesive between the current spreading layer and the conductive polymeric sheet.

33. A method according to claim 30, wherein the current spreading layer consists essentially of one or more metals.

34. A method according to claim 30, wherein the current spreading layer comprises an electrically conductive ink.

35. A method according to claim 30, wherein the current spreading layer is coextensive with the upper side of the conductive polymeric sheet.